

ARTICLE XI.

SOME CONSIDERATIONS IN MILITARY SURGERY OF THE FEMUR. (WITH CASE OF EXCISION AT HIP-JOINT.) By JOHN VAN RENSSELAER HOFF, A.M., M.D., Captain and Asst. Surgeon U.S.A.

THERE is a peculiarity about gunshot wounds so characteristic that it marks a wide difference between the practice of surgery in civil and military life. It has been well said that as a science, surgery, wherever practised, is one and indivisible; but as an art, it varies according to the peculiar nature of the injuries with which it has to deal, and with the circumstances in which it falls to be exercised—more particularly is this true of military surgery, which is ever changing as the conditions and appliances of warfare change. The history of the great campaigns of the world (their tactical evolutions, strategical operations, the climate and country in which conducted, the quantity and quality of supplies, and especially the style of armament) is the history of equally varied changes in the surgery of war. The improvement in arms of precision, the wonderful growth of great guns, the terribly increased destructiveness of missiles, large and small, are but few factors among many which are gradually but surely working radical changes in military surgical practice. Paré wrote in the sixteenth century, "Truly when I speak of the machines which the ancients used for assaulting men in combats and encounters, it appears to me as if I spoke of infant's toys in comparison with these, which, to speak literally, surpass in figure and cruelty the things which they thought the most cruel." Macleod,¹ commenting upon this remark, says, "When Paré thought the cannon of his day so enormous and destructive, what can we say of those huge sea-service mortars and immense cannon used to defend and attack Sebastopol?" and yet these very guns are, in their turn, little more than toys in comparison with the monsters of destruction now in use. As there is ever an increase in the destructive power of arms, there should be an equal, if not greater increase in the power of conservation possessed by the military surgeon. Recent experience teaches us that a real advance has been made in this direction, though certainly until our war of the rebellion statistics present anything but an encouraging picture; while the opinions of authorities were nearly unanimous that any attempts at temporization in gunshot wounds of the femur were, as a rule, not good surgery.

Mr. Holmes² says:—

"In field practice . . . excepting, in certain special cases, in fracture above the knee from rifle-balls, amputation is held by most military surgeons to be a necessary measure. The special cases are gunshot fractures of the upper third of the femur, especially if it be doubtful whether the hip-joint is implicated or not, for in them the danger attending amputation itself is so great that the ques-

¹ Notes on Surgery of Crimean War.

² A System of Surgery, II., 2d Edition.

tion is still open whether the safety of the patient is best consulted by excision of the injured portion of the femur, by removal of detached fragments, and trusting to natural efforts of union, or by resorting to amputation."

He further says :¹—

"When a patient with gunshot fracture of the femur comes under a surgeon's charge, however free from complications, and however favourable the case may appear to be, the surgeon knows that the patient will be invariably subjected to a wide variety of hazardous circumstances, if an attempt to conserve the injured limb be determined upon."

Dr. Macleod,² in speaking of shot fractures of extremities, says :—

"It can hardly be doubted that the great striving after conservation, which influenced the surgeons of our army (English), was one main cause of that mortality which attended these injuries. Full of the promise of the schools, we would not admit that any injury apparently so slight could withstand the assiduities of a wise conservatism," but the author was soon forced to conclude "that though union did in rare cases follow compound fractures in the middle and lower third of the thigh, still the ultimate percentage of loss was greatly less when primary amputation had been performed than when limbs were saved, or tried to be preserved, or removed at a late period." . . .

Dupuytren maintains that,³ "in compound fractures from gunshot, in rejecting amputation we lose more lives than we save limbs." This opinion was fully endorsed by the French surgeons, and finally John Bell,⁴ deducing his conclusions from experience and statistics, says of the attempt at conservation :—

"Taking a retrospective view, we see in true perspective all the dangers of a nine months' cure, which is but a weary travel, step by step, betwixt life and death. In this view, we see the dangers of frequent fevers, wasting diarrheas, foul and gleety sores; some dying suddenly of gangrene, some wasted by profuse discharge and successive suppurations, new incisions, and unexpected discharges of spoiled bone; we see those who recover halting on limbs so deformed and cumbersome that they are rather a burden than a help. In the very moment that we hear of such a cure, we know how much the patient must have suffered, and how poorly he has been cured: and we can, from the long sufferings of those who escape, tell but too truly how many must die."

During the latter part of the Crimean war, under the most favourable circumstances, and in most favourable cases, selected because injury to the bone and soft parts was comparatively slight, only 9 per cent. of compound fractures of femur recovered without amputation, while 34.7 per cent. in apparently less favourable condition, recovered after this operation.

The comparative value of temporization and amputation in the Crimean and in our own war (1861 to 1865), is indicated in the following table :⁵—

¹ Loc. cit. ² Loc. cit. ³ Clinical Lessons. ⁴ Treatise on Gunshot Wounds.

⁵ Shot fractures of thigh occurring during war of 1861 to 1865 (thus far reported and traced to conclusion) are divided as follows :—

	Treated expectantly.			Treated by amputation.		
	No. of cases.	Recover- ed.	Percent- age of mortality.	No. of cases.	Recov- ered.	Percent- age of mortality
Upper third of thigh . . .	330	93	71.81	32	8	75.00
Middle third of thigh . . .	238	106	55.46	93	42	54.83
Lower third of thigh . . .	173	72	57.79	243	131	46.09
Mean percentage of mortality			61.68			58.64

	Treated expectantly. Percentage of mortality.	Treated by amputation. Percentage of mortality.
Crimean war ¹	90.30	65.20
War of rebellion ²	61.68	58.64

Our statistics show an advance of nearly 33 per cent. beyond those of the Crimea, in favor of temporization, and but 3 per cent. in favor of amputation as against the expectant plan, while the results of our amputations are only about 7 per cent. better than those from the same operation in the Crimea. Allowing the 7 per cent. to represent the difference in surroundings and circumstances of patients, and deducting this from the 33 per cent. gain for temporization, we have remaining 26 per cent. to indicate the advance made by conservative surgery. Surely if statistics are worthy of any credit, this exposition may inspire the hope that "new methods" will not, in time to come, prove so unavailing as their "new methods" seem to have in the Crimean war.

If there has been any question in the mind of the military surgeon as to the value of conservation in shot fracture of shaft of femur, there seems to be no doubt upon that subject in its relation to gunshot wounds of the hip-joint; they certainly are to be treated conservatively, apparently, because in any event the same fatal result must obtain. To again quote Bell:³ "As for a wounded joint, we may take the united experience of all surgeons, which has established this as the true prognostic, that wounds of the joints are mortal." Macleod admits this conclusion with a reservation. He says:⁴ "No class of gunshot injuries prove more uncertain in their results, or are more commonly followed by disastrous consequences." While military surgeons agree that there is little to hope from temporization, amputation and excision have thus far given equally unfavourable results; though it is questionable whether the latter method has been sufficiently tried to deduce from statistics of the operation any logical conclusions. There seems to have been some hope during the Crimean war that good would result from more frequent resort to the operation of excision; but it never came into general use. Of six excisions of the hip-joint, primary and secondary, but one case recovered; this was a primary operation, and naturally led to the conclusion that primary excisions were much more successful than secondary, an opinion justified by the statistics; but the number of cases was too small to establish a principle. Moreover, though this one case recovered from the operation, it can hardly be regarded as a successful case, as the patient, though he lived ten years, never had a useful limb. The records of the Italian campaign (1859) are equally discouraging; four excisions were performed, all re-

¹ Macleod's Surgical Notes on Crimean War.

² Circular Orders, No. VI., Surg.-General's Office, U. S. A., November 1, 1865.

³ Loc. cit.

⁴ Loc. cit.

sulting disastrously, while of the sixty-three operations done during our war (1861 to 1865) but five recovered.

On the other hand, amputation at the joint apparently gives more satisfactory results; for including primary, intermediate, secondary, and re-amputations of our war, the mortality was 78.84 per cent., though in both French and English armies of the Crimea *all* cases of amputation at this joint proved fatal. In view of the Crimean statistics, M. Legouest¹ maintained that amputation at the hip-joint should be abandoned except when the great bloodvessels are involved. If, then, as a *dernier resort*, the operation is decided upon, it should be delayed until the last justifiable moment—immediate primary amputation must *never* be performed in any case. Baron Larrey² indorsed these conclusions, adding, however, an additional indication for operation, in extensive laceration of soft parts about the joint. Brevet Lieut.-Col. G. A. Otis, Medical Department U. S. Army,³ in his report upon coxo-femoral amputations during the war 1861 to 1865, dissents from views previously obtaining in regard to this operation. He says:—

“1st. We have learned that the primary operation for traumatic causes is not uniformly fatal, as has latterly been taught, and are enabled to define three conditions under which it should be undertaken, while two other conditions in which it may be justifiable are left *sub judice*. 2d. Much evidence has been brought to controvert the prevailing doctrine that disarticulation at the hip is an exception to the general rule requiring all amputations, deemed indispensable, to be performed immediately, the eighteen intermediate amputations performed during the war having all resulted fatally. 3d. We have proved that secondary amputations at the hip for necrosis of the whole of the femur, or for chronic osteomyelitis following gunshot injuries, may be performed with as successful results as hip-joint amputations for other pathological causes. 4th. It has been shown that when, after amputations in the continuity of the thigh, the stump has become diseased, reamputations at the hip may be done with comparative safety.”

With these facts in view, and in the light of experience gained during the Franco-Prussian war, 1870-'71, Prof. Von Langenbeck⁴ naturally reaches the conclusion that the statistics of gunshot wounds of the hip thus far obtained, have not established the principles upon which this lesion should be treated. In fact, their teachings have rather resulted in evil, for the very hopelessness with which this injury has been hitherto regarded, leads to a hasty examination, and an equally hasty conclusion that the unfortunate patient was beyond the pale of surgery, because, forsooth, it is written, “wounds of the joints are mortal.” Prof. Von Langenbeck believes that an early and accurate diagnosis in these cases is essential to their cure, and that the sooner this fact is realized by military surgeons, the sooner will statistics of the future give very different results from statistics

¹ Mémoires de la Société de Chirurgie, 1860.

² Loc. cit.

³ Circular No. 7 W. D., S. G. O., Washington, D. C., July 1, 1867.

⁴ Surgical Observations on Gunshot Wounds of the Hip-joint, translated by J. F. West, etc.

what *not* to do, for between expectation, excision, and exarticulation, the lines are so closely drawn that there could scarcely be an imputation of bad surgery if resort was had to either method of treatment. An appeal to civil statistics of excision in cases of morbus coxarius proves but little more satisfactory, the same doubt of the advisability of this operation, and the same discrepancy in results again meet us. In this connection, I was particularly impressed with the conclusions of Mr. Holmes, as set forth in a clinical lecture on "Results of the Operation of Excision of the Hip," in which he says, "from what I have myself seen of the operation I should base its claims to adoption, in suitable cases, not on its ultimate results being superior to the natural cure, but on its success in saving life in cases where the natural cure appears improbable." In other words, the operation is to be regarded simply as a forlorn hope, a something to be done, when Nature's efforts have proved unavailing, and the unfortunate patient is about to succumb to the disease. But even this concession has a reservation, for Mr. Holmes further remarks, "we can never say that the natural cure is impossible, except in cases where recovery from the operation of excision is so also."

Such an opinion from such authority is in itself almost enough to condemn the operation. But what is left for our patients? The picture is familiar in all its Hogarthian outlines to every surgeon; our author colours it but delicately when he says:—

"We know the length of time and the amount of care which such cases require when carious bone has to be gradually removed by ulceration or necrosis, and deep-seated abscesses or long sinuses have to close up. Many patients require years, and some require many years, of the most sedulous care before they are well, or indeed out of danger of a fatal relapse."

The experience of our own countryman is undoubtedly happier than that of English surgeons. Dr. Sayre, whose opinion of excision as an operation might be regarded as that of an enthusiast, did not the successful results of his cases justify it, says:²—

"The most favourable cases healed by kindly nature . . . have been left with permanent deformity, and with a very much less useful limb than those which have been cured by exsection. I have now performed this operation over fifty times, and can, therefore, speak with positive assurance upon this subject."

Mr. Holmes believes³ that, though the mortality from direct results of the operation is not great, only about one-quarter of the cases operated upon result in a complete and permanent cure; while, on the other hand, Dr. Sayre's⁴ cases which recovered, all had "more or less good motion," excepting one, in which the after-treatment was left in other hands.

As to the mortality of this operation in civil practice, the following table, quoted from authorities therein named, will give an approximation:—

¹ Medical Times and Gazette, London, vol. ii., No. 1427.

² American Clinical Lectures, vol. i.

³ Loc. cit.

⁴ Loc. cit.

	Percentage of mortality ¹ in civil surgery.
Barwell (London)	36.36
Leisrink (Hamburg)	63.60
Sayre (New York)	25.00(?)
Mean percentage of mortality	41.65

Which is in somewhat striking contrast with the results of the same operation, as recorded, in four wars.

	Percentage of mortality in military surgery.
Crimean war	83.33
Italian campaign, 1859 (French)	100.00
War of rebellion	91.17
Franco-Prussian war	86.66
Mean percentage of mortality	90.29

There can be no question that the circumstances under which this operation is performed in the one case and in the other differ widely, so far as the primary operation for shot fracture is concerned, but the conditions of patient and place in the secondary operation are not necessarily so far removed from those which obtain in the same operation for morbus coxarius that the military surgeon can afford to leave the latter entirely out of consideration. The differences of opinion which undoubtedly exist between civil surgeons as to the value of excision in disease of the hip find their counterpart in the same differences which army surgeons entertain relative to the proper treatment of shot-wound of this joint. In the hope of contributing towards the final solution of these questions I present the following case:—

CASE.—Sergeant W. L., Company “M,” 4th U. S. Cavalry, admitted to Post Hospital, Fort Fetterman, Wyo. T., March 29, 1877, with gunshot wound of right hip-joint; is an American, aged 22 years. L. was wounded in a cavalry fight with Cheyenne Indians, November 25, 1876. The bullet (probably conoidal, calibre 50, weighing 412 grains) entered right groin three inches below and slightly internal to anterior superior spinous process of ilium, and two and three-quarter inches external to symphysis pubis, passing obliquely backward through hip-joint it fractured neck of femur, notched posterior segment of rim of acetabulum and made exit in gluteal region at point on a right line joining the great trochanters, twelve and three-quarter inches from left, and four and one-quarter inches from right sides (present dimensions). Immediately after receiving wound pa-

¹ The percentage of useful limbs is estimated as follows:—

	Percentage of useful limbs.
Barwell	67.85
Holmes	42.84
Sayre	99.00
Mean percentage	69.89

tient was carried to rear, had a plaster-of-Paris bandage applied, was dragged on a travois¹ over an almost impassable country, during weather so cold that mercury froze, reached supply-camp on third day, when plaster bandage was removed and reapplied; and finally, he was carried thence to Cantonment Reno in an ambulance wagon. Patient was received into a temporary hospital at latter place after a five days' journey over a country where roads are unknown, in weather of the utmost severity, and under circumstances of hardship which skilful care and unremitting attention could but little alleviate. A week after arrival at Reno the plaster bandage was removed, the limb elevated, and the wounds front and rear, now discharging pus freely, were treated with simple dressings. In four weeks the wound of entrance closed, and, though the exit was still discharging, an immense abscess formed in and about the joint which pointed in anterior cicatrix; finally opened spontaneously, and remained so for several months. A light extending weight was used for a short time, and no medicine given, except occasionally morphia for pain and physic for constipation.

March 24, 1877. Patient was transferred from Cantonment Reno, and after five days' journey on a stretcher, slung in an army wagon (a very comfortable method of locomotion), reached Fort Fetterman, Wyo. I found his condition as follows. Very emaciated, pale, and pain-worn; weight about 100 pounds (striking contrast with the 180 pounds, weighed at date of injury); thoracic and abdominal viscera apparently healthy;² pulse and respiration greatly accelerated; two suppurating sinuses were found leading into articulation in positions already indicated; and both hip and knee-joints ankylosed (fibrous). Patient had not moved from recumbent position since receiving injury, and could not even be raised upon a bed-pan without great pain. Immediately upon arrival he was put under tonic treatment, with milk-punch, cod-liver oil, and generous diet; the wounds were dressed with carbolic acid solution (one per cent.); the bowels freely opened and kept regular. When patient had fairly recovered from exhausting effects of journey, a side splint, after Sayre's short splint, was applied, which enabled him to be moved without pain (this was relieved when in bed by an extending weight of eighteen pounds). He soon grew sufficiently strong to walk about on crutches, and until a few weeks before operation, took considerable exercise in the open air. Morphia was given hypodermically from time to time in increasing quantity to allay pain, never absent. These measures were instituted in the hope that suppuration would be checked, bony ankylosis result, and the patient recover with a stiff but moderately useful member. Unlike those cases of morbus coxarius which have progressed to the third stage and left the leg distorted and dislocated, here we had neither of these conditions, the limb was straight, in its proper place, and exactly like its fellow,

¹ A rude horse litter.

² There were functional derangement of heart and anæmic murmurs, but I could discover no organic difficulty, either of heart or lungs. The remarkable rapidity of pulse and respiration in this case are features of no little interest. There seems to be no definite relation existing between these and the temperature, and no apparent cause. A similar case is reported to have occurred during the Crimean war. The operation was secondary, after shot fracture of neck of femur, not implicating head of bone. The patient lived two weeks, and finally died of exhaustion; while he lived the pulse remained very high, never below 120, though his aspect was so calm "it led one to expect a more subdued state of the circulation." (McLeod's Notes on the Surgery of the Crimean War.)

except there was no joint at the hip, only a suppurating sore, which discharged so freely as to leave no doubt of the presence of carious bone in the articular cavity. Certainly, if there was ever a case of hip-disease (traumatic or idiopathic) which held out reasonable hope of recovery under the expectant plan, this was one; and it was in this belief that I instituted the line of treatment already indicated. The patient had everything in his favour,—a comfortable habitation, plenty of nutritious food, sufficient air and exercise, the most careful attention, and yet, though, at first, there was an apparent gain, I came finally to see that he was gradually but surely failing; the suppuration still continued as profuse as in the beginning, and confirmed a suspicion long entertained, but which could not be verified previous to operation, that when the neck of femur was fractured, the round ligament ruptured, and the head of the bone lay, a foreign body, in the joint.¹

It was simply a question as to whether or not the patient had sufficient strength remaining to get rid of dead bone still in the joint, which must yet be considerable in amount. I believed not, for he grew so feeble, and complained of so much pain towards the last, it seemed to me but a question of weeks between an operation or death. The expectant plan had been fully and fairly tried. The patient had suffered “all the dangers of a nine months’ cure,” with its weary travel, and I now resolved to operate at once. The excision (after Sedilott) was done September 28, 1877, and the condition of joint found to be as surmised. There was partial bony ankylosis; spiculæ of bone (after the manner of flying buttresses), had been thrown out front and rear, and though yet but slight, firmly bound the femur to the pelvis; in the cotyloid cavity lay the caput femoris, reduced to half its normal size, and more resembling a petrified sponge than the dense head of the femur. This mass was easily removed; $2\frac{1}{4}$ inches of shaft of femur (including trochanters) sawn off, a small spicula of dead bone gouged out of notch in acetabulum, and the fibrous adhesions about knee-joint broken up. This completed the operation; easily performed, and almost bloodless. There was a large abscess burrowing along femur about five inches, filled with pus, which discharged through incision. The neck of femur looked rather as though it had been cut across by some sharp instrument, than fractured by a bullet, and was not fissured in any direction; the acetabular cavity was apparently healthy. The wound was thoroughly cleansed, a long drainage tube introduced, the edges approximated with sutures, and dressed antiseptically; not a single ligature was used during or after operation; the hemorrhage was slight; purulent discharge profuse. Extension straps and bandages were then applied, and the patient placed in a double splint² of domestic manufacture, somewhat after the fashion of Sayre’s “cuirass,” with an extending weight of eighteen pounds.

¹ I was present at a clinic held by Prof. Sayre, in Bellevue Hospital, N. Y., a few years since, when he operated on a case of morbus coxarius, presenting exactly these features. The patient, a child, had fallen upon the hip and sustained an intercapsular fracture of femur with rupture of ligamentum teres; when the excision was done, these conditions were at once diagnosed and verified.

² This splint is simply a light iron frame, made to loosely fit the lower extremities posteriorly, and extending from the ankle externally to the waist, internally to about two inches below the perineum. The limbs are placed at an angle of 15 or 20 degrees to facilitate use of bed-pan. Such a splint can be made by any blacksmith; and though not so expensive an instrument as the Sayre “cuirass,” I think, answers

Sept. 28 (after operation). Patient quite weak. To have *sp. vini gallici* $\mathfrak{z}$ ij in divided doses, at short intervals. Effects of anæsthetic having disappeared, complains of intense pain in hip and knee-joints. To have *morph. sulph. gr. j* (hypodermically) at 1 P. M.; *gr. $\frac{1}{4}$* at 2 P. M., and *gr. $\frac{1}{6}$* every hour after if necessary. (Took altogether in twenty-four hours *gr. $2\frac{3}{4}$* .)

29th. Doing well; opiate allayed pain; patient passed a comfortable night; dressing not changed; no perceptible odour from wound; temperature normal; pulse 100. To have *sp. frumenti* $\mathfrak{z}$ iv. in a quart of milk during day; *quinia sulph. gr. j* every two hours; *morph. sulph. pro re nata*; not to exceed one grain in twenty-four hours; milk diet.

30th. Complains of considerable pain. Wound dressed; discharge very free and somewhat offensive, slightly tinged with blood; to continue treatment, and have oil bath once daily. Temperature and pulse unchanged.

October 1. Discharge copious, saturating bandage; is healthy, non-offensive pus; wound dressed; bowels constipated. To continue treatment, and have *magn. sulph. $\mathfrak{z}$ j*. A. M., temp. $98\frac{2}{3}^{\circ}$; pulse 110; respiration 21. P. M., temp. $101\frac{2}{3}^{\circ}$; pulse 118; respiration 25.

2d. Passed restless night; no operation of bowels; to have at 4 P. M. *magn. sulph. $\mathfrak{z}$ ss*, and, if non-effective, at 9 P. M. *calomel gr. x. et jalap gr. v.* The latter dose was given; produced free catharsis and great relief. A. M., temp. $101\frac{2}{3}^{\circ}$; pulse 112; respiration 17. P. M., temp. $100\frac{2}{3}^{\circ}$; pulse 115; respiration 24.

3d. No apparent change; still requires morphia in varying amounts, and constantly complains of pain; wound dressed; edges here and there uniting by first intention; drainage-tube acting effectively. A. M., temp. $98\frac{4}{5}^{\circ}$; pulse 104; respiration 21. P. M., temp. $99\frac{1}{5}^{\circ}$; pulse 106; respiration 17.

4th. Passed restless night; complains of griping pain in bowels; is weak from continued catharsis; has tenesmus; wound dressed; is doing well; discharge still very profuse. To omit quinia; continue treatment; have *sp. vini gallici $\mathfrak{z}$ j* 10 A. M. and 4 P. M., and suppository, *opium gr. vj* at 7 and 9 P. M. A. M., temp. $99\frac{3}{5}^{\circ}$; pulse 103; respiration 27. P. M., temp. $98\frac{1}{5}^{\circ}$; pulse 110; respiration 24.

every purpose, and has at least two virtues not possessed by its more elegant prototype—cheapness and accessibility. The method of application is as follows: Splint having been thoroughly padded (the padding resting upon roller bandage, carried from side to side of each limb from bottom to top, a small space being left for defecation), the patient is placed therein, and secured by bandages from ankle to groin, and a belt about the waist; the foot-piece, a bit of board, is movable on the injured side, and perforated with holes through which pass the extending straps, to be secured to a bar attached to splint, or to rope carrying weights and playing over a fixed pulley. On the sound side the foot-piece is fixed, the foot presses against it, the leg is securely bound and affords perfect counter-extension. If a patient has to be moved from camp to camp, or from bed to bed, the extending straps are secured to the bar, and he can be carried with the least inconvenience and pain. There is nothing about this apparatus original with me, and I have described it so minutely, simply because I believe it to be very essential to the successful after-treatment of hip-excision cases, and because it is so easily improvised. If iron and a blacksmith are not at hand, the double-splint, made of three pieces of board (not unlike, in form, a pair of wagon shafts), recommended by Dr. Hamilton in cases of fracture of femur in children, would do almost as well, and could be constructed under the most adverse circumstances.

5th. More comfortable; wound looks healthy; bed-sore on sacrum (chronic since shortly after receiving wound), is spreading in spite of preventive measures; discharge from wound so copious as to keep sore constantly bathed in pus; dressed (with wound) antiseptically. To continue treatment, omitting brandy, and opium suppository. A. M., temp. $98\frac{3}{8}^{\circ}$; pulse 108; respiration 24. P. M., temp. $98\frac{3}{8}^{\circ}$; pulse 101; respiration 24.

6th. The great advantage of double splint is fully demonstrated. The patient can be turned on his side to permit of wound being dressed, and moved to another bed while his own is being aired and changed, with the least amount of pain. The extending adhesive straps, causing some uneasiness, were removed and reapplied. A. M., temp. $98\frac{3}{8}^{\circ}$; pulse 102; respiration 26. P. M., temp. $98\frac{3}{8}^{\circ}$; pulse 106; respiration 28.

7th. Bowels acting regularly; appetite very capricious; wound looks well; bed-sore still spreading. A. M., temp. $100\frac{1}{8}^{\circ}$; pulse 125; respiration 27. P. M., temp. $99\frac{3}{8}^{\circ}$; pulse 120; respiration 30.

8th. Passed restless night; very weak and unable to endure suffering; opiate is given freely up to limit of one grain morphia in twenty-four hours; wound dressed; no unfavourable change in appearance; bed-sore spreading and ugly. A. M., temp. 99° ; pulse 102; respiration 24. P. M., temp. $99\frac{1}{8}^{\circ}$; pulse 124; respiration 21.

9th. Very weak, but cheerful (when pain ceases a little); wound still discharges freely, frequently saturating bandages, and interfering with complete asepsis. (The utmost care was taken to prevent contamination, but not always successfully.) A. M., temp. $98\frac{3}{8}^{\circ}$; pulse 120; respiration 12. P. M., temp. $99\frac{3}{8}^{\circ}$; pulse 116; respiration 16.

10th to 16th. Between these dates condition remained without marked change. Wound was dressed daily, union had occurred, except at two points; one, anterior, communicating directly with large deep abscess; the other, posterior, giving exit to drainage-tube. The bed-sores (several had appeared) were healing kindly, and altogether there was a slow, but sure improvement. Treatment continued. Appetite very delicate.

17th. Passed a very restless night; complains of pain in all the joints, and has diarrhoea. There had been occasional slight spasmodic action of injured limb, not very troublesome. On this date it became excessive, so that one spasm followed another in constant succession, causing excruciating agony; the action seemed entirely confined to ham-string muscles. Wound dressed, discharge less, but healthy; continue treatment. To have potass. brom., gr. v, every two hours; sp. vini gallici, $\mathfrak{z}$ ij, and opium suppository, gr. v, at 9 P. M.

18th. Spasmodic action not quite so severe, though sufficient to cause much suffering. Wound dressed, discharge slight and healthy; bed-sores doing well. To continue treatment, giving potass. brom., gr. x, every three hours, omitting brandy, and opium suppository.

19th. Passed comfortable night, with very little spasmodic action. Discharge from wound so slight and healthy that drainage-tube was removed. Antiseptic dressings continued.

20th. Fever running high; spasmodic twitching continuous, and exhausting. Wound dressed, discharge but slight, looks healthy. To continue treatment, have tr. digitalis, $\mathfrak{m}$ x, every four hours; quiniæ sulph., gr. x, every three hours; potass. brom. et chloral hydrate, $\mathfrak{aa}$ gr. x, p. r. n. A. M., temp. $102\frac{2}{8}^{\circ}$; pulse 150; respiration 25. P. M., temp. $102\frac{2}{8}^{\circ}$; pulse 137; respiration 32.

21st. Spasm almost uncontrollable; is excited by the slightest stimulus,

as sudden noise, a touch, draught of air, in fact any unlooked-for occurrence, even the moving of patient's finger. Wound dressed, discharge unchanged; lower sinus contracting; a probe introduced through upper sinus passes in along bone six inches; syringed sinuses with carbolic solution (five per cent), and dressed antiseptically. To continue treatment, reduce potass. brom. et chloral hydrate to gr. v every three hours, and omit quinia. A. M., temp. $101\frac{2}{3}^{\circ}$; pulse 125; respiration 36. P. M., temp. 102° ; pulse 132; respiration 28.

22d. No noticeable change; still complains of great pain. Bowels open and regular; appetite nil, must be forced even to take milk; discharge from wound scanty and somewhat offensive. To continue treatment. A. M., temp. $100\frac{4}{5}^{\circ}$; pulse 122; respiration 28. P. M., temp. 102° ; pulse 132; respiration 29.

23d to 24th. No improvement; patient very weak, hardly able to endure the slight fatigue and pain of dressing wound; is constantly under influence of narcotics, and continually demanding something to relieve his sufferings. To continue treatment, increase tr. digitalis to $\mathfrak{m}$ xv, every three hours, and have quinia sulph., gr. xv, at 9 P. M.

25th. Slight improvement; is brighter, and complains less of pain in hip and knee. Discharge from wound scant, but healthy. To continue treatment, omit potass. brom. et chloral, and have $\mathfrak{R}$. Strychnia sulph. gr. ss.; cannab. ind. gr. xv; pulv. rhei, gr. xx; quinine, gr. xxx. M. Divide pil. No. xxx. One pill every three hours. A. M., temp. $98\frac{4}{5}^{\circ}$; pulse 118; respiration 24. P. M., temp. $99\frac{2}{5}^{\circ}$; pulse 132; respiration 24.

26th to 29th. During this time the wound was dressed daily; the discharge was scanty, but healthy; the bed-sores had not healed, but were not spreading; the spasmodic action continued. No change in treatment.

30th. Passed restless night; complains of severe pain of throbbing character about joint; cicatrix, and orifices of sinuses red and puffy; redness extending some distance on either side; discharge slight; dilated lower sinus and reintroduced drainage-tube. To continue treatment, omit digitalis, and have quinia sulph. gr. xx, at 9 P. M.

31st. Very copious discharge from wound saturating bandages and running into bed. On removing dressing pus is found pouring freely from drainage-tube and anterior sinus, as well as through the old wound of exit which had opened since last dressing. (This track closed spontaneously shortly after patient arrived.) Wound looks better, and patient feels much more comfortable, though very weak. To continue treatment.

Nov. 1 to 5. General condition unchanged; the discharge continued very copious; bed-sores constantly bathed in pus are extending, though superficially; spasmodic actions still a most disagreeable feature; only partially controlled by morphia, of which an average of half a grain daily has been taken, hypodermically, since operation. Wound dressed daily, and treatment continued.

6th. Discharge less copious; again removed drainage-tube; patient very comfortable, though still troubled with the spasmodic jerking; all functions regularly performed.

7th to 10th. The sinuses again contracted, and old wound of exit nearly closed; discharge from anterior opening still free, of a thick cheesy character. At every dressing the greatest care was taken to inject all sinuses thoroughly with carbolic solution (5 per cent.), and to maintain compression, both with adhesive straps and bandages, to prevent any further bur-

rowing of pus (from time of operation). Patient complains of copious cold sweats occurring both day and night. To have atropine gr. $\frac{1}{60}$, hypodermically, once daily; be sponged with alcohol and water, equal parts; omit strychnia pills.

11th. Discharge apparently entirely from deep abscess, and principally through anterior sinus; legs are twice weekly removed from splint and exercised; both are quite stiff, the right, at knee-joint, especially so; there is here considerable thickening, and some excoriation; the latter due to traction of extending straps. To have quiniæ sulph., gr. x, at 9 P. M., with chloral hydrate, gr. x, during night.

12th. Passed comfortable night; took chloral as prescribed at 1 A. M.; discharge quite free from abscess; of a thick, curdy character; non-offensive odour; bed-sores all doing nicely; exit of bullet-track entirely closed; spasm still frequent and painful; appetite improving slightly.

13th. The case has now practically resolved itself into one of chronic abscess. In this view, believing that a cure of the abscess would result in successful termination of treatment, and a failure to cure in death of patient from exhaustion, resolved to forcibly distend suppurating cavity with antiseptic solution (Collander's method). Having introduced long tube of universal syringe deep into cavity, injected 5 per cent. solution carbolic acid $\frac{5}{100}$; result, rupture, instead of distension of pyogenic membrane (miscalculation of capacity of abscess, and force applied). Patient without pain; antiseptic dressing, as usual, and continue treatment. To have quiniæ sulph., gr. xxx, at 9 P. M., given gr. v at dose; the whole to be taken in half hour (rule always followed with large doses of quinine). A. M. temp. $98\frac{4}{5}^{\circ}$; pulse 116; respiration 15. P. M. temp. $103\frac{1}{5}^{\circ}$; pulse 142; respiration 38.

14th. Passed restless night; complains of soreness in tissues of thigh; anterior and external (abscess was posterior and internal); considerable swelling in this region, with boggy feel of cellulitis; wound dressed; discharge very scanty from both openings; no spasmodic action. To continue treatment, and have quiniæ sulph., gr. xl, at 9 P. M. A. M. temp. $101\frac{3}{5}^{\circ}$; pulse 128; respiration 24. P. M. temp. $104\frac{1}{5}^{\circ}$; pulse 142; respiration 38.

15th. Swelling and soreness of tissues still the marked feature. Introduced hypodermic needle, but could discover no pus; complains of great pain, which patient says is near surface and not at bone as formerly; spasm entirely ceased; discharge from wound slight and healthy. To continue treatment, have tr. digitalis, $\mathfrak{m}$. xv, tr. ferri chloridi, $\mathfrak{m}$. x, every three hours, and quiniæ sulph., gr. x, at 9 P. M. A. M. temp. 101° ; pulse 114; respiration 21. P. M. temp. $100\frac{3}{5}^{\circ}$; pulse 115; respiration 20.

16th. Passed very restless night; pain increasing, only partly controlled by narcotic (morphia); is very weak; will eat nothing; bowels constipated; tongue coated and dirty; breath offensive; very little discharge from wound. To continue treatment, have pil. hydrarg. gr. v, and quiniæ sulph., gr. x, at 9 P. M. A. M. temp. $101\frac{1}{5}^{\circ}$; pulse 115; respiration 24. P. M. temp. $100\frac{3}{5}^{\circ}$; pulse 116; respiration 20.

17th. Discharge from sinuses very copious, saturating bandage and bed clothing; odour exceedingly offensive. Patient slept quite well, and says he has less pain; tissues still very sore to touch; bowels moved freely. To have quiniæ sulph., gr. x, at 9 P. M. A. M. temp. $99\frac{3}{5}^{\circ}$; pulse 116; respiration 21. P. M. temp. $100\frac{1}{5}^{\circ}$; pulse 115; respiration 20.

18th. Sweats continue, though not so free; mydriasis complete, much to patient's discomfort; thinks he is losing eyesight; discharge from wound very copious, offensive, and rusty; bed-sores again very troublesome; swelling somewhat diminished. To continue treatment, and have quiniæ sulph., gr. x, at 9 P. M. A. M. temp. $98\frac{4}{5}^{\circ}$; pulse 100; respiration 20. P. M. temp. $100\frac{2}{5}^{\circ}$; pulse 110; respiration 30.

19th. Pus pouring out copiously through sinuses, and along track of entrance, which reopened during night; discharge still very offensive and rusty; swelling and pain considerably diminished; complains of nausea. To continue treatment; omit digitalis and iron, and have quiniæ sulph., gr. xv, at 9 P. M. A. M. temp. $100\frac{1}{5}^{\circ}$; pulse 122; respiration 28. P. M. temp. $100\frac{2}{5}^{\circ}$; pulse 122; respiration 28.

20th. Patient much more comfortable. Discharge diminishing, still offensive; whole appearance improved, eyes bright, tongue clean. To continue treatment. A. M. temp. $99\frac{1}{5}^{\circ}$; pulse 103; respiration 18. P. M. temp. $100\frac{2}{5}^{\circ}$; pulse 111; respiration 23.

21st. Double splint replaced by single straight splint. Discharge still quite free, but non-offensive, and in character very different from curdy matter which came from deep abscess before rupture. There are still some pain and swelling. To continue treatment.

22d to 24th. Continued improvement; less pain and more appetite; discharge still quite free. Bed-sores inflamed and painful. Patient becoming reconciled to new splint, got up for first time (22d) since operation, and by aid of nurse and crutches walked to chair, near bed, and sat in it a few minutes, a position not before assumed in a year; renounced bed-pan, used commode (23d). Treatment continued; had quiniæ sulph. gr. x, each night, and on 24th tr. ferri. chlor. $\mathfrak{m}$ xv three times daily.

25th. Very little discharge; bed-sores doing well; pain but occasional. Spasmodic jerking again, first time since 13th inst., not so severe as formerly; sweating less; atropine continued as usual. To continue treatment, and have quiniæ sulph. gr. x at 9 P. M.

26th to 30th. During this time improvement was very gradual, the spasmodic action continued, and even extended to left leg; the constant jerking irritated bed-sores, which could not in any way be protected from some pressure. Daily exercise was taken; considerable difficulty experienced with all joints of lower extremities, which were stiff, and sore; massage was regularly employed. Discharge had greatly diminished, and anterior opening of wound track again closed; superior and inferior sinuses very much contracted; probe arrested after entering half an inch. On 27th inst. bowels becoming constipated were relieved by simple enema, and tr. ferri. chloridi omitted. Appetite continued precarious, with but slight improvement. No nausea. Pain still present, relieved by morphine, now reduced to maximum of gr. $\frac{1}{3}$ (hypodermically) in twenty-four hours. Patient had taken milk punch, cod-liver oil, had oil baths and milk diet, occasionally varied with solid food, when he could be induced to eat it, almost continuously since operation. Antiseptic dressing, as usual, was renewed each day, an operation much more difficult and painful since removal of double splint. To continue treatment, and have every alternate night quiniæ sulph. gr. x.

Dec. 1 to 3. Patient still very weak; handles crutches and moves about with greater difficulty than at first; considerable soreness at hip and knee, and stiffness of all joints; finds it impossible to touch left heel to ground, ankle so stiff; soon gets fatigued while sitting in chair; spasm still per-

sistent; sweats very freely in spite of atropia, and alcohol baths; very little discharge of healthy character. To continue treatment.

4th to 9th. Patient had chill on the 4th, more of a creepy cold feeling than a well-defined chill; probably caught cold while at stool; muscles of face and neck, as well as lower extremities, very stiff; unable to move head forward without assistance, or to open mouth; spasm intense and painful; discharge growing less, is thin and healthy; bowels constipated; abdomen tympanitic; appetite unimproved; sweats profuse. To continue treatment, have simple enema, pil. hydrarg. gr. v. (4th), with Rochelle salts ʒij in morning; chloral hyd. gr. xv every four hours, quinia sulph. gr. x 9 P. M. (5th). From 9th instant there was scarcely an untoward symptom, convalescence progressed slowly but surely, stiffness of neck disappeared entirely about 15th instant; tympanitis lasted three days; spasm persisted, but with greatly reduced violence, nearly two weeks after extending weight was removed (27th inst.). Patient had daily exercise, increasing excursions from ward to ward, until finally, January 10, 1878, he took his first walk in open air. Discharge grew less in amount, ceased 13th inst., and dressings were removed entirely 15th inst. Bed-sores all healed, except one on sacrum, nearly closed, dressed with simple cerate. December 27th, side splint was removed and the treatment practically ended. Appetite quickly returned, until it grew beyond satisfaction; patient took meals at table during Christmas week, first time in fifteen months: joints and muscles gradually lost rigidity under massage and use; motion at hip quite free in all directions, and joint sufficiently strong to bear whole weight of body as early as December 30th; sweats disappeared with returning strength. Medicines were discontinued on 17th inst, and afterwards only occasional doses of quinia given.

Shortening of leg on getting up two inches; weight 100 pounds, increased to 127 pounds Jan. 15, 1878; morning and evening temperature varied about one degree for two months after convalescence was established, when it finally settled down to the normal; pulse continued higher than the other symptoms appeared to justify, though at last examination there was no discoverable organic lesion; motion in every direction at hip was sufficiently free to permit of easy locomotion, and the joint surprisingly strong. It is probable that compensatory falling of the pelvis on right side will reduce apparent shortening to about one inch.

In reviewing this case, not the least important consideration is, when, if at all, under similar circumstances, should an operation be done? I think there can be little doubt that in military surgery, at least, the joint should be excised at the earliest moment after patient has reached an hospital. Prof. Von Langenbeck believes that the mortality attending operation would be less if done within twenty-four hours after receipt of injury. Dr. Macleod also advocates early excision. Such a course has at least three indisputable arguments in its favor: it saves the patient pain, the surgeon work, and the government expense. The extent of operation, the amount of bone excised, of course will depend upon extent of injury, though it seems to have been the rule in surgery that the trochanters must always be removed, for the alleged reason that their presence mechanically prevents union of incision. Von Langenbeck, Otis, and, more recently, other authorities, condemn such unnecessary sacrifice. It

is fair to presume that, in this case, had the joint been simply opened, the detached head of femur removed, a drainage tube introduced, and trochanters left intact, the results would have been even better than those now obtained.

But in any event, the operation, *per se*, is of secondary importance, and we must look for successful results from excision, not in the manner of its performance, but in the after-treatment of the case; herein, I believe, lies the secret which enables Dr. Sayre to recommend excision as the treatment, *par excellence*, for morbus coxarius, a recommendation which, in the light of such statistics as he presents, cannot be ignored. In the after-treatment of this case (as in all secondary excisions for shot wounds of hip), we met with abscesses of greater or less extent, which became the most important elements in its treatment (and an additional argument in favor of primary operations). The spasm, due to rigidity of hamstring muscles, seemed to be governed by no rule; one day severe, the next scarcely perceptible, it baffled nearly every effort at control; narcotics, even in excessive doses, had as little effect as the increasing of the extending weight to thirty pounds or its reduction to six pounds. There was no malposition of limb, and tenotomy was not resorted to, as neither the condition of the patient nor the parts seemed to justify it. A somewhat remarkable fact in this connection is, that with rupture of deep abscess spasmodic action ceased entirely, and did not thereafter recur, excepting very occasionally, with much diminished force.¹

The object of this paper is to invite the attention of the profession to the fact that, as yet, there is no surgical procedure in gunshot wounds, particularly in shot fractures of femur, so successful that it can be accepted as *the* treatment for such cases. With increasing experience, surgeons are coming to believe that their predecessors have pronounced too emphatically upon methods of treatment and disastrous results of certain gunshot injuries, for they have seen many patients who by the old rules should die, not alone live, but possess such useful members, that their wounds are recalled as hardly more than a disagreeable episode.

FORT MONROE, VA., 1881.

ARTICLE XII.

REMOVAL OF THE ENTIRE UTERUS FOR THE CURE OF CANCER OF THE CERVIX, WITH A REPORT OF TWO CASES. By CLINTON CUSHING, M.D., Prof. of Gynecology in the Medical College of the Pacific, San Francisco.

CASE I.—March 1, 1881, I was consulted by Mrs. A. B. for severe pain in the region of the womb. She was apparently healthy, was aged

¹ L. was returned to duty with his regiment in Texas, where he remained for nearly a year, and was finally discharged the service. The limb became very useful, and permitted of locomotion without crutch or cane.